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# Need for Content Reengineering of the Medical Library and Information Science Curriculum in Iran

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## Introduction

Over the past two decades, medicine and health care education and practice have been undergoing a continuing revolution, in which the explosion of information and the application of information technology have played a fundamental role. Telehealth/ mHealth, evidence-based medicine (EBM), information therapy (Ix), patient-centered healthcare, consumer health information services and shared decision making, doctor-patient communication, patients' right to information and right to health, are instances of new approaches in medical education and healthcare policies that influence medical library services increasingly and change the expectations of medical libraries users.

The need for timely and quality filtered information at the moment in care, overwhelming amount of information on different platforms, and lack of time and expertise (Davidoff and Florance, 2000 ; Task force , 2003) on the part of physicians to find, assess and apply information in their daily decision making have created an environment for library and information science professionals to play a vital role in storage, retrieval, appraisal, management, summarizing and delivery of timely and reliable health information at the point of care. "The health sciences librarian believes that knowledge is the sine qua non of informed decisions in healthcare and the health sciences librarian serves society, clients, and the institution, by working to ensure that informed decisions can be made" (Medical Library Association, 2007).

At the same time, a growing number of tools and applications of information and communication technology (ICT) such as Web 2.0 along with its various facets (e.g. Blogs, Wikis, FaceBook, Podcasts, etc.) and mobile phone

technology have created an opportunity for LIS professionals to utilize them in their profession and practice to improve patient care and present their longstanding information service in new knowledge based and ICT based environment. This changing environment exerts pressure on medical library and information science education to develop new curricula, revise the syllabuses of existing curricula and adopt new tools to practice

## Review of Literature

The first medical librarianship course was developed in the year 1939 in the United States with an emphasis on medical bibliography, and was offered at Columbia University by Thomas Fleming (Roper, 1979). In 1946, more emphasis began to be placed on medical library administration, cataloging and classification, and acquisitions procedures (Brodman, 1954). From 1939 to 1977, courses were introduced into the curricula of forty-seven of the sixty-four library schools in the United States (Roper, 1979). In 1977, thirty-four of the forty-seven schools of library science in the U.S. included work with MEDLINE to some degree (Berk & Davidson, 1978). At the same time, four LIS schools in Canada also were offering Medical Librarianship courses. In 1977, the World Health Organization (WHO) undertook to support the establishment of a medical library school in the Imperial Medical Centre of Iran. Among its objectives was the training of qualified medical librarians for Middle Eastern medical libraries. In the summer of 1977, the University of Illinois undertook to create and manage a school of health library and information science set up at the medical centre for this purpose (Harvey, 1989). The two-year Master's curriculum was similar to the curricula of other library schools in the mid-1970s except for its medical librarianship and technology related subjects (Hayati & Fattahi, 2005). In 1979, Iran University of Medical Sciences (IUMS) (formerly The Imperial Medical centre) established the School of Medical Library and Information Science (MLIS) and opened admission to its Master of Medical Library and Information Science program (Sanjesh Organization, 2005 & 2008). Maybe, the first practical attempt for the specialization of practice of Medical Librarianship occurred in the U.S. in the form of Clinical Librarianship. "Lamb, and subsequently Algermissen, were instrumental in obtaining support, in particular from the National Library for Medicine, for several CL initiatives in the US in the 1970s." (Winning & Beverley, 2003). The initiative was successfully accepted by other hospital librarians in the U.S., and consequently created new challenges for librarians to learn, teach and collaborate with health providers in team working environments, such as the work reported by Dodson S (2001). In the late 1980s, the first subject specialization in library science and documentation, and its integration with biomedical chemistry as well as electronic engineering was developed in Germany (Seeger, 1987). This program was accepted and implemented by other polytechnics and universities in their curriculum development in Germany (Hariri, 1995). In 1990, the need for specialist librarians in various fields was highlighted and approved by the High Council of Educational Programs in Iran, and consequently the accredited medical universities were authorized by the Ministry of Health and Medical Education (MHME) to establish the Bachelor of Medical Librarianship/MedLIS (Hariri, 1995). The Biomedical and Pharmacy Library and Information Science program have been established at the City University of London (Hariri, 1995). The College of Librarianship Wales, U.K., also have included a health librarianship program in its Master's degree curriculum (Hariri, 1995). In 1996, Liu Xiao Chun and Fang Ping, describing the historical background of China's medical librarianship education, suggested a Master of Medical Library and Information Science education program for China. In 2000, Davidoff and Flofrance in an editorial of the *Annals of Internal Medicine* opened a new horizon for medical librarianship with the concept of "informationist". Consequently, the MLA Board of Directors proposed a name change for the new health professional to reflect a more universal health sciences practice context. The new name for the profession was "Information Specialist in Context (ISIC)" (Shipman, 2007) to reflect practice environments in nonclinical as well as clinical settings. Detlefsen (2004) presented an introduction to the distance education

program at the University of Pittsburgh's library and information science school and described a model program linking the biomedical library at Vanderbilt University with the School of Information Sciences at Pittsburgh. The U.S. National Library of Medicine began to support medical informatics through a fellowship program at the Johns Hopkins University providing opportunities for librarians to utilize the rich environments of the Welch Medical Library and the Division of Health Sciences Informatics in support of life-long learning (Campbell & Roderer, 2005). Bridges, Miller and Kipnis (2006) discussed the content and applicability of a biomedical informatics course sponsored by the National Library of Medicine for librarians, clinicians, educators and administrators. The University of Pittsburgh School of Information Sciences, through its Library and Information Science program, offers the Medical Librarianship/Medical Informatics Specialization as part of its 12 courses and 36-credit Master of Library and Information Science (MLIS) degree. Health Consumer Resources and Services (Credit Code: LIS 2885), and Application in Medical Informatics (Credit Code:LIS 2887) are listed among the courses presented by University of Pittsburgh (2009). The authors earlier studies on the librarians special services for EBM in Iran revealed that librarians in Iran face problems in offering new services (97.7%) for the lack of trained staff (88.3%) and they need to be trained in offering special services like EBM (95.3%) (Gavgani, 2009). Presently, among the 40 medical universities (under MHME) in Iran, 10 universities offer medical library and information science (MedLIS) at the bachelor's level and six universities offer Master of MedLIS. However, no university has a PhD program in MedLIS in Iran (see Appendix 1). This study examines the curricula of medical library and information science education (MedLIS) departments in the universities of Iran to find out: 1) Whether evidence-based medicine, patient education, information therapy (Ix) skills and their required background subjects are incorporated in LIS curricula. 2) Whether the utilization of Web2.0 applications and mobile phone technology in health library services are included in the LIS education. 3) Whether the content of the LIS academic courses offered by Iranian Medical LIS schools meet the clinical/medical librarians' professional needs.

The study will provide some ideas to curriculum planners in the LIS schools in developing countries in general and Iran in particular regarding the courses that are essential to include in MedLIS programs in general and Health Information Technology (HIT) in Iran.

## Methodology

The study utilized content analysis to identify concepts related to emerging trends and approaches in medical librarianship among the syllabuses of medical library and information science programs in Iranian universities. The list of Iranian universities offering MedLIS programs are given in Appendix 1, and the list of BSc and MSc courses in the programs are given in Appendix 2. A literature review was also carried out to extract the new approaches in healthcare and medical education and practice as well as use of new Web-based platforms that influence medical LIS practice and education worldwide. The concepts of EBM, information therapy (Ix), Web2.0, medicine 2.0, library 2.0 and the roles that a medical/clinical librarian can play/is playing in healthcare content were extracted from relevant literature and a checklist was developed. The concepts were categorized in six groups (Table 1).The syllabuses were examined against the checklist to find out whether the emerging approaches and professional need for medical/health librarians have been included in MedLIS education in Iran.

## Medical Librarians' Professional Needs in the Present Environment

The syllabuses and curriculum of medical library and information science programs in Iran were analyzed to find out whether the concepts related to emerging professional needs of medical librarians were covered by the academic

education of LIS. The concepts extracted from the relevant literature were grouped into six categories (see Table 1) including 'research methodology', 'evidence-based approach', 'health consumer Information', 'Web 2.0', and 'm-Health/m-Libraries' and Medical Informatics.

Table 1. Categorization of the concepts related to trends and new approaches in medical librarianship

Group	Category	Concepts
1	Research Methodology	Randomized Control Trials, Cohort Studies, Meta analysis, Systematic review, Decision analysis, Qualitative research (focus groups, ethnographic observations, historic, etc.) (Eldrege, 2002) .
2	Evidence-Based Approach	EBM, EBLIP (Booth, A. 2002, Eldrege, 1997, 2002, Crumley, E. and Koufogiannakis, D,2002 ), PICO (Sackett et al,1998), SPICE, CristalCecklist, (Booth, Brice, 2003; UNC,2006), systematic Reviews, EBA 5 steps answering Cycle, Critical Appraisal.( Rosenberg, Donald, Richardson, Wilson , Nishikawa and HaywardS, 1998; Cook, Jaeschke,and Guyatt , 1992; Epling, Smueny, Patil and Tudiver , 2002, Eldredge, 2000)
3	Consumer Health Information (CHI) Resources and Services	Information Therapy. Patient Education, Information Prescription, Personalizing Information for patients: summarizing, making readable, translating to vernacular language, transferring to appropriate format, team working with physicians, attending ward round, reading EMR or patients chart , (Ix Center for Information Theraoy,2008; Kemper and Mettler,2002a;2002b; hlwiki,2008a, 2008b, University of Pittsburgh, 2009)
4	Web 2.0, Medicine/Health 2.0, Library 2.0, Open Access Repositories	Blog, Wiki, Facebook, podcast, slideshare, videoshare,pjotoshare,flicker (Zarea Gavgani,V. , Vishwa Mohan, V. 2008). Open Access , open software and Open Archive Repositories,
5	eHealth, mHealth/mLibraries	E-Health, HER, HL7. Use of mobile devices such as mobile phone, PDAs (personal digital assistants) in collecting aggregate and patient level health data, providing healthcare information to practitioners, researchers, and patients, delivering library service to users via mobile phone. (Ulla-Maija Maunu , 2006; Mohamed Ally,et.al., 2007a;2007b; Yang Cao, et.al, 2008)
6	Medical Informatics	Decision support/decision analysis, knowledge representation, and artificial intelligence (Bishop, S. , MacDonald , 2004)

The frequency of appearance of one of the concepts coded under each category was counted as existence of the category in the syllabuses of MedLIS. Therefore, the existence of a category (i.e. topic evidence based approach) does not necessarily mean that each and every concept under the category was observed in the syllabuses of MedLIS in Iranian universities.

## Result and Discussion

Among the 6 categories examined in this study (Table 1) only one, i.e., 'research methodology', existed in 100% of the syllabuses of MedLIS departments

in Iran (Figure 1).

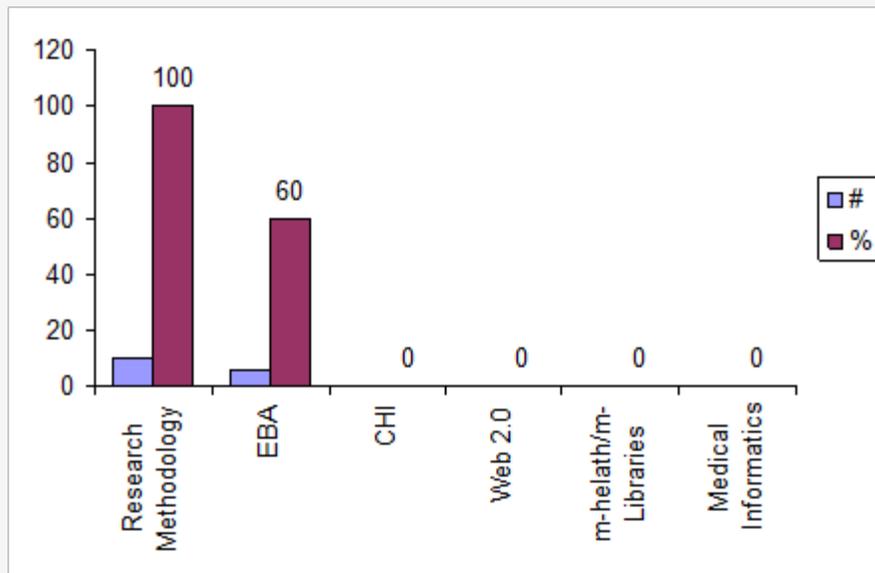


Figure 1. Appearance of the examined categories in the Iranian MedLIS syllabuses

The evidence-based approach as one of the major categories including EBM, EBLIP and related concepts stood in the second rank, appearing in 60% of the syllabuses. The concepts coded under the categories 'consumer health information', 'Web 2.0', 'm-Health/m-Libraries' and 'medical informatics' did not exist in the syllabuses of MedLIS in Iranian universities.

However, in the category of 'research methodology' (see Figure 2), the concepts of 'randomized control trials', 'cohort studies', 'meta analysis' and 'decision analysis' which are features of rigorous research methods have not been included in the examined syllabuses. Only 46% of the examined concepts were observed in the syllabuses of MedLIS in Iran, including experimental research (14.2%), qualitative research (14.2%) and systematic reviews (14.2%).

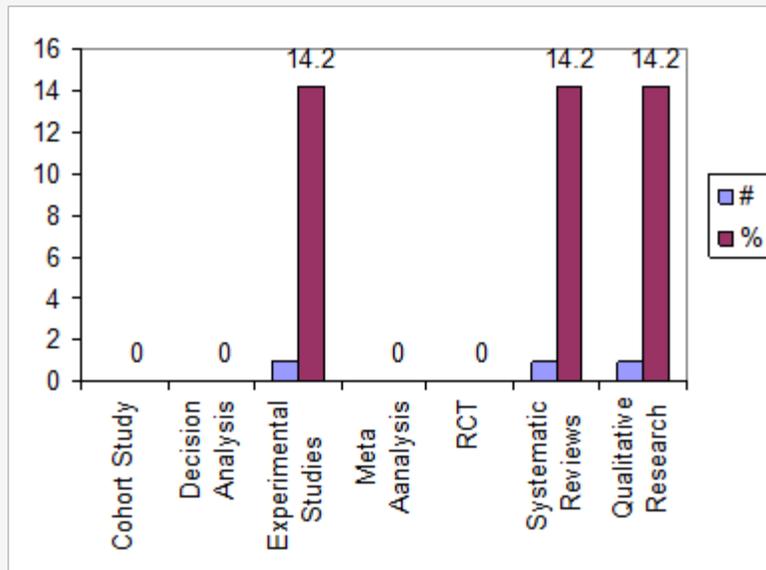


Figure 2. Appearance of the concepts related to Research Methods in the Iranian MedLIS syllabuses

Since 1995, Medical Library Association (MLA) has given more importance to research and encouraging librarians to do research and develop high level evidence for librarianship (Medical Library Association, 1995; 2007; McKnight, Michelynn, Rain Hagy, Carolyn, 2009). This study showed that rigorous research methods in health science and health librarianship have not been considered

adequate in MedLIS syllabuses. It needs to be an area of focus to enable librarians not only to conduct rigorous research but also to assess the validity, reliability and applicability of the evidence/information they retrieve and present for their users.

## Evidence-Based Approach (EBA)

According to the checklist, the concepts evidence-based medicine (EBM), five steps of EBA evaluation, Critical Appraisal, PICO, EBLIP and SPICE were examined against the MedLIS syllabuses to examine their inclusion in the education of MedLIS in Iran. Each of the EBM, PICO, Critical Appraisal, Five steps of EBM, appeared 16.6% in the syllabuses. The concepts *evidence-based library and information practice* (EBLIP) and SPICE did not appear in MedLIS syllabuses in Iran (see Figure 3).

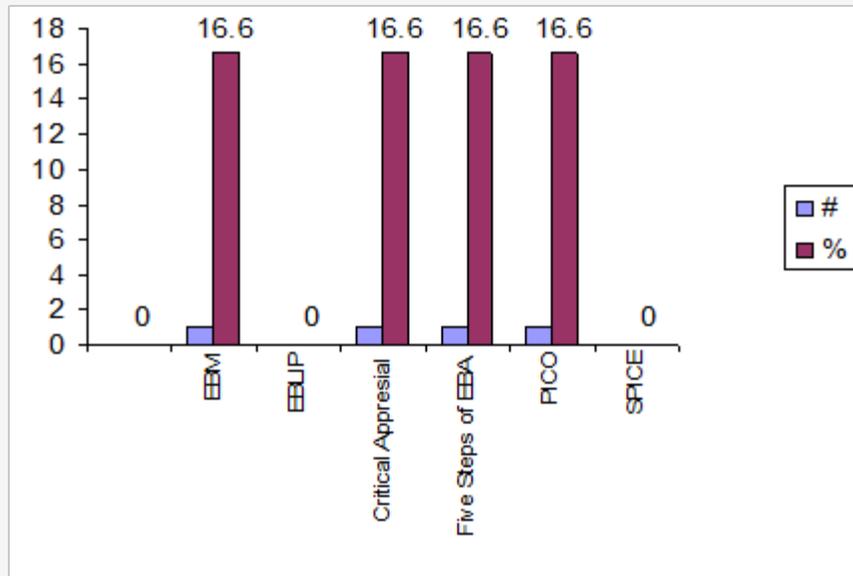


Figure 3. Appearance of the concepts of EBA in the syllabuses of MedLIS in Iran

For the concepts in the category of the evidence-based approach (EBA), 64.6% were found in the syllabuses of 60% of the MedLIS departments (see Figure 3). Evidence-based medicine (EBM) has been included in the syllabuses of Iranian Medical LIS education. But evidence-based library and information science practice (EBLIP) has not been included in the syllabuses of Iranian MedLIS although it is presently taught in most medical schools and medical librarianship programs as a separate credit course as well as online courses (EBLIP-Gloss, 2007). While medical librarians in Iran "theoretically mix reference service, information literacy as well as traditional evaluation of reference materials with evidence-based information and level of evidence"(Gavagni, 2009).

## Consumer Health Resources and Services

Tracing the concepts of information therapy and consumer health information (CHI) service showed that these concepts have not been included in Iranian MedLIS curricula and syllabuses (see Figure 1). With the advances in IT, medicine and healthcare have shifted crucially from a doctor-centered approach to a patient –centered one, in which the patient is a bonafide member of the healthcare system with equivalent right to information, decision making and health. One of the very important services of Clinical/Medical Libraries is consumer health information services, specifically information therapy and patient information service. Information therapy can be defined as offering personalized specific health/medical information to patients to help them to make right medical decisions or change their behavior, a recent approach in medicine that requires library-based information services. In this connection consumer health resources and services is

offered in medical librarianship curriculum. Pittsburgh University is one example (<http://www.ischool.pitt.edu/lis/degrees/services/health.php>). We analyzed MedLIS syllabuses to find out whether "consumer health resources and services"(Table 2) and its relevant concepts of 'information therapy', 'patient education' 'patients guideline' and related services such as 'making information readable', 'summarizing', 'translating' information for patients', have been included in the syllabuses. The results show that the above-mentioned concepts are not included in MedLIS curriculum.

## m-Health/m-Libraries

The concepts of "m-Health/m-Libraries" and "application of mobile phone in healthcare information services and education" also have no frequency in the Iranian MedLIS curricula and syllabuses (see Figure 1). Application of mobile phone and mobile computers in the delivery of health and information is widely accepted by the health care industry. The growing capabilities of mobile phone along with its powerful wireless network has made it the first choice for accessing and delivering information in different formats and different sizes including text/hypertext, voice, image, movie and hypermedia. Health and medical information are commercially translated to mobile compatible software. Libraries in advanced countries like Canada have started to deliver their services to mobile phones. For instance, the Athabasca University (AU) library has taken an active role in advocating mobile learning within the institution and has been developing mobile friendly resources and services to diverse learners since 2004 (Yang Cao, Tony Tin, Rory McGreal, Mohamed Ally, Sherry Coffey, 2008). It is expected that the syllabuses of MedLIS in developing countries in general and Iran in particular should address these skills and knowledge as well.

## Web2.0 and Open Archive Repositories

None of the concepts included in the category of "Web 2.0, medicine/health 2.0, library 2.0, open software and open access repositories" appeared in the syllabuses of MedLIS in Iran (see Figure 1). Web 2.0 and its reflection in specific fields like Library, health and medicine have given birth to medicine 2.0, health 2.0 and library 2.0 as catchphrases in the literature. Practically all of the before mentioned concepts refer to the application of second generation Web, including ease of use, interactive and freely available open software on the Internet such as blogs, wikis, social networking and folksonomies. Also open archiving and open access are important developments in information science, management, and delivery that most of the libraries in advanced countries utilize in making their archives and information available world-wide. The Harvard College *Thesis Repository* ([www.hcs.harvard.edu/thesis/repo/](http://www.hcs.harvard.edu/thesis/repo/)) and University of Melbourne ePrint repository (UMER) (<http://www.lib.unimelb.edu.au/eprints/>) are instances of such movements in advanced countries. However this study revealed that none of these technologies and approaches has been included in MedLIS syllabuses in Iran.

Do the content of the LIS academic courses offered by Iranian Medical LIS schools meet the clinical/medical librarians' professional need?

The result of the study indicates that only longstanding library and information tasks like classification, cataloging, acquisition, reference works and use of computer appear widely in MedLIS syllabuses in Iran. But new trends and technologies are not included or only slightly included in MedLIS syllabuses in Iran (Figure 1). The content of courses offered by Iranian Medical LIS schools do not meet the clinical/medical librarians' professional needs. It is now a must for libraries to keep in tune with fast-growing advances of technology to provide ubiquitous and high quality services for their users directly and indirectly. It is not absolutely required to deliver services to users directly from the library space, but it is

essential to make the right information easily available to the public and specific groups of information users.

## Conclusion

Education is a basic element for the best practice in any field and profession. A knowledge based environment and knowledge based information service require both evidence based education and training, to be inline with technological changes of information environment and to meet the changing need and preference of the information patrons. Nowadays medical libraries services around the world have been affected by the fast growing changes in Information Communication Technology (ICT) and medical education. Evidence-Based Approach, Problem Solving education, Patient-Centric Healthcare, m-Health and Healthcare IT in Medicine and healthcare and Web 2.0 applications, mobile computer technologies in the other hand require a knowledge based information service. Librarian's traditional skills and background knowledge are not sufficient to meet the changing needs of their customers. Librarians need to be empowered by new skills and information before going to empower their patrons. This means there must not be a gap between librarian's professional/technological knowledge and their society's informational needs that to be answered by librarians. There are two types of education needs for any professionals and librarians as well, including basic academic education (background information) and training (on the job training). In view of this the syllabuses of medical library and information science (MedLIS) education in Iran have a crucial need for revision to include the new professional skills, approaches and trends in medical information science and healthcare policies regarding dissemination of health information to publics, patients as well as health providers. The result of a poor educational background will make librarians face difficulty offering appropriate services and it will lead to a lack of confidence in librarians and their library service. Therefore, it is strongly suggested to create change in the syllabuses of academic medical library and information science education in developing countries in general and Iran in Particular to empower and prepare them to play their significant role dissemination of right information to right person at right time, to support patient safety and improvement in healthcare outcomes.

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#### Appendix 1. Universities and Colleges which includes MedLIS in Iran

University	Faculty/ School	Level of education	Year of Establishment
Iran	School of Management and Information Science	B.Sc. & M.Sc.	1989 /1974
Kerman	School of Management and Information Science	B.Sc.	1991
Isfahan	School of Management and Information Science	B.Sc.	1992
Tabriz	Faculty of Paramedicine	B.Sc. & M.Sc	1994/ 2005
Shahid Beheshti	Faculty of Paramedicine	B.Sc.	1997
Jondi Shapoor	Faculty of Paramedicine	B.Sc.	2000
Zahedan	Faculty of Paramedicine	B.Sc.	2000
Hamadan	Faculty of Paramedicine	B.Sc.	2005
Booshehr	Faculty of Paramedicine	B.Sc.	2006
Tehran	Faculty of Paramedicine	M.Sc.	2006

Appendix 2. Courses offered by Iranian Medical Library and Information Science Departments/Schools

Course Credit	Syllabuses	Level of Edu.
Organization of information	Theories, systems, and practices of cataloging and classification; AACR2 rev., MeSH, NLM Classification, LCSH, LC classification, etc.	B.Sc.
Reference and information services (General)	Information resources and their use in libraries and information Services; reference theories, principles and practices; general reference work; information sources in science, social science and humanity, and etc.	B.Sc.
Reference and information services (medical)	Medical Information Resources, Print, Online, on CDs	B.Sc. & M. Sc.
Management of libraries	Management and administrative principles and practices; problem-solving, public relations and program development. Theories and practices in information organizations planning, organizing, staffing, directing, and control; group team management; organizational leadership; conflict and agreement	B.Sc.
Collection management, development and acquisitions	Principles and practices in selecting, evaluating, and managing collections in all types of libraries and information formats; identification of reliable print resource, databases; Information resource development; building and maintaining Collections	B.Sc.
Children and youth services and Literature	Children and young adults and reading; evaluation of both print and non-print materials for children and young adults, from birth to age twelve including multicultural materials; reader's advisory; storytelling: art and techniques	B.Sc.
Medical Data Banks, Familiarity	Structure, arrays of data banks, Internet, Web, CD-ROM	B.Sc.
Introduction to Computer and Programming	Familiarity with Computer, Interfaces, Operators, Devices, Input/Output, famous programming languages (e.g. C++, Pascal.)	B.Sc.
Data Banks/data bases and services in Library	Library software, application of Information Technology in library services, familiarity with Information Systems, concepts of Information Society and Information Systems , designing maintaining Information Systems, (T)	M.Sc.
Research Methodology	Report Writing, Citation Styles, Research Types in General, Some most used /typical research Methods in Library science like Survey, Experimental, Historical, care study, descriptive, etcetera. .. Sampling, data collection Methods,	B.Sc. & M.Sc.
Research Seminar Presentation	Trends in LIS, Critical Thinking, preparing and presenting a small research paper in the interested subject by the student	M.Sc.
Medical		

Terminology (basic and Clinical)	Medical and Health Related Terms and terminology, familiarity with medical Language	B.Sc.
Indexing and Abstracting	Indexing and abstracting, vocabulary control, thesauri	M.Sc.
Web Designing	Concepts of HTML, XML, creating web page using FrontPage	M.Sc.
Principles and fundamentals of Library Science	History and evolution of libraries and Library Science in western, Arabic, Islamic, Eastern countries. famous libraries, national libraries. Role of libraries in Information dissemination	M.Sc.
Internship	Preparing students to work in the medical/clinical libraries through working in the libraries	BSc./MSc.
Thesis	Doing research on the selected /interested subject	MSc.
Library Buildings and Equipments	Designing Library Building providing furniture and equipments of libraries according to the environment and the situation and goals of the parent organization	BSc.
Information Technology and Information Systems	Expert systems and computer components, knowledge base, artificial intelligence, computer hardware and software, Visual Basic	MSc
Periodicals	Acquisition and collection development and assessment of medical periodicals.	MSc
Data Processing	Introduction to Hardware and software, binary, octal, decimal and hexadecimal systems, algorithm and flowchart, Programming (Using C++ via Microsoft Visual Studio 6 C++).	MSC

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